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10/572,765

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EXAMINER

KESSLER, CHRISTOPHER S

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

12/04/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--|---------------------------------------|--|
| Office Action Summary | Application No. 10/572,765 | Applicant(s) ANDREES ET AL. | |
| | Examiner CHRISTOPHER KESSLER | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Responsive to the amendment filed 19 June 2009, no changes are made to the claims. Claims 6-14 are currently under examination.

Status of Previous Rejections

2. Responsive to the amendment filed 19 June 2009, new grounds of rejection are presented.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Us Patent 4,089,456 issued to Toppen et al. (hereinafter "Toppen").

Regarding claim 6, Sasaki teaches the invention essentially as claimed. Sasaki teaches a method of manufacturing turbine components (see abstract). Sasaki teaches that a rotor component is injection molded, then is sintered and sinter bonded to another component in order to make the component (see col. 3). Sasaki teaches wherein the sintering is "completely or incompletely" (see col. 3), and wherein the materials are made smaller and into elaborate shapes (see col. 4) meeting the limitation of debinding

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the green part and wherein the molded articles are shrunk by sintering to have a desired geometric property. Sasaki teaches that the parts to be joined are brought into contact, and are joined during sintering (see col. 3).

Sasaki does not teach wherein the method is used to create components of an aircraft engine. Sasaki teaches manufacturing a radial flow gas turbine rotor unit that may be used for a turbocharger (see col. 1, col. 4 and Figs. 1-4). It would have been obvious to one of ordinary skill in the art at time of invention to have applied the method to making a gas turbine for a turbocharger of an aircraft engine. The Examiner takes Official notice that radial flow turbochargers for aircraft engines are well known in the art and would have been obvious to those of ordinary skill in the art of turbine manufacture. Applicant is further directed to MPEP 2144.03.

Sasaki does not teach wherein pressure is applied to the molded articles that are to be joined together during the sintering process. However, it is well known in the art of metallurgy to use the application of pressure to enhance sintering, and also to use the application of pressure to enhance diffusion bonding.

For example, Toppen teaches a method of controlled-pressure diffusion bonding (see col. 1, Summary of the Invention). Toppen teaches that the method is primarily used for the diffusion bonding of turbine components (see col. 1). Toppen teaches that a fixture is used to hold together two workpieces to be joined, and that the difference in thermal expansion of the materials causes the pressure to be applied (see Summary of the Invention). Toppen teaches that the fixture comprises controllable shim members which can be deformed during the process in order to apply a uniform pressure to

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provide an optimum bond across the workpiece and prevent distorting the workpiece (see Summary of the Invention).

It would have been obvious to one of ordinary skill in the art to have practiced the diffusion bonding method of Sasaki, and to have used the fixture of Toppen to apply pressure during the diffusion bonding, because Toppen teaches that this fixture allows a pressure to be applied to provide an optimum bond across the workpiece and prevent distorting the workpiece (see Summary of the Invention).

Regarding claim 7, Sasaki teaches wherein a slip is applied to the surface to be joined (see col. 3), meeting the limitation of applying a coating.

Regarding claim 8, Sasaki teaches wherein a slip is applied to the surface to be joined (see col. 3).

Regarding claim 9, Sasaki teaches wherein the shaft is pre-sintered, and the rotor is green (see col. 4 and Fig. 4), meeting the limitations of wherein one component having greater shrinkage rate is sintered onto the other having lower shrinkage rate.

Regarding claim 10, Sasaki teaches wherein the components formed comprise a rotor having integral blading (see Figs. 1-4).

Regarding claim 11, Sasaki teaches the invention substantially as claimed. Sasaki teaches a method of manufacturing turbine components (see abstract). Sasaki teaches that a rotor component is injection molded, then is sintered and sinter bonded to another component in order to make the component (see col. 3). Sasaki teaches wherein the sintering is "completely or incompletely" (see col. 3), and wherein the materials are made smaller and into elaborate shapes (see col. 4) meeting the limitation

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of debinding the green part and wherein the molded articles are shrunk by sintering to have a desired geometric property. Sasaki teaches that the parts to be joined are brought into contact, and are joined during sintering (see col. 3).

Sasaki does not teach wherein pressure is applied to the molded articles that are to be joined together during the sintering process. However, it is well known in the art of metallurgy to use the application of pressure to enhance sintering, and also to use the application of pressure to enhance diffusion bonding.

For example, Toppen teaches a method of controlled-pressure diffusion bonding (see col. 1, Summary of the Invention). Toppen teaches that the method is primarily used for the diffusion bonding of turbine components (see col. 1). Toppen teaches that a fixture is used to hold together two workpieces to be joined, and that the difference in thermal expansion of the materials causes the pressure to be applied (see Summary of the Invention). Toppen teaches that the fixture comprises controllable shim members which can be deformed during the process in order to apply a uniform pressure to provide an optimum bond across the workpiece and prevent distorting the workpiece (see Summary of the Invention).

It would have been obvious to one of ordinary skill in the art to have practiced the diffusion bonding method of Sasaki, and to have used the fixture of Toppen to apply pressure during the diffusion bonding, because Toppen teaches that this fixture allows a pressure to be applied to provide an optimum bond across the workpiece and prevent distorting the workpiece (see Summary of the Invention).

Regarding claim 12, Sasaki teaches wherein the sintering is “completely or incompletely” (see col. 3), meeting the limitation wherein the first and second molded articles are reduced in size.

Regarding claim 13, Sasaki does not teach wherein the components are brought into contact during the debinding process. Sasaki only teaches that the components are brought into contact after sintering “completely or incompletely” (see col. 3). However, the rearrangement of the order of steps would not materially affect the results of the process. *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results). In the instant case, the process is materially the same whether the components are brought into contact during the debinding process or after sintering “completely or incompletely” as taught by Sasaki (see col. 3).

Regarding claim 14, Sasaki teaches that the molded articles are brought into form-fitting contact (see cols. 3-4 and Fig. 4).

Response to Arguments

5. Applicant’s arguments, filed 19 June 2009, with respect to the rejection(s) of the claim(s) over Sasaki have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made over Sasaki in view of Toppen.

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In particular, the examiner agrees that the teaching of Sasaki that the assembly is secured with a threaded nut (see col. 4 and Fig. 4), does not meet the limitation of applying pressure to the molded articles during the sintering process. The examiner agrees that Sasaki contemplates joining the impeller to the previously-joined shaft and rotor assembly by a means other than diffusion bonding. However, the limitation of applying pressure would have been obvious to one of ordinary skill in the art at time of invention, for the reasons stated above.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER KESSLER whose telephone number is (571)272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793

csk